



## UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

## NOTICE OF ALLOWANCE AND FEE(S) DUE

52349 7590 1603/2008

WENDEROTH, LIND & PONACK L.L.P.  
2033 K. STREET, NW  
SUITE 800  
WASHINGTON, DC 20006

EXAMINER

HAGAN, SEAN P

ART UNIT

PAPER NUMBER

2828

DATE MAILED: 10/03/2008

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/576,107	04/18/2006	Kiminori Mizuuchi	2006_0568A	1714
TITLE OF INVENTION: COHERENT LIGHT SOURCE AND OPTICAL DEVICE				

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	01/05/2009

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. **PROSECUTION ON THE MERITS IS CLOSED.** THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN **THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE** OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. **THIS STATUTORY PERIOD CANNOT BE EXTENDED.** SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

## HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

**IMPORTANT REMINDER:** Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

# **PART B - FEE(S) TRANSMITTAL**

**Complete and send this form, together with applicable fee(s), to:** Mail **Mail Stop ISSUE FEE**  
**Commissioner for Patents**  
**P.O. Box 1450**  
**Alexandria, Virginia 22313-1450**  
 or Fax **(571)-273-2885**

**INSTRUCTIONS:** This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

52349 7590 10/03/2008

**WENDEROTH, LIND & PONACK L.L.P.**  
 2033 K. STREET, NW  
 SUITE 800  
 WASHINGTON, DC 20006

## **Certificate of Mailing or Transmission**

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/576,107	04/18/2006	Kiminori Mizuuchi	2006, 0568A	1714

TITLE OF INVENTION: COHERENT LIGHT SOURCE AND OPTICAL DEVICE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	01/05/2009

EXAMINER	ART UNIT	CLASS-SUBCLASS
HAGAN, SEAN P	2828	372-050110

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.  
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a **Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 \_\_\_\_\_  
 (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 \_\_\_\_\_  
 3 \_\_\_\_\_

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee  
☐ Publication Fee (No small entity discount permitted)  
☐ Advance Order - # of Copies \_\_\_\_\_

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.  
☐ Payment by credit card. Form PTO-2038 is attached.  
☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number \_\_\_\_\_ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature \_\_\_\_\_ Date \_\_\_\_\_  
 Typed or printed name \_\_\_\_\_ Registration No. \_\_\_\_\_

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/576,107

04/18/2006

Kiminori Mizuuchi

2006\_0568A

1714

52349

7590

10/03/2008

EXAMINER

HAGAN, SEAN P

ART UNIT

PAPER NUMBER

2828

DATE MAILED: 10/03/2008

WENDEROTH, LIND & PONACK L.L.P.  
2033 K. STREET, NW  
SUITE 800  
WASHINGTON, DC 20006

## Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 58 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 58 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

# Notice of Allowability

## Application No.

10/576,107

## Examiner

SEAN HAGAN

## Applicant(s)

MIZUUCHI ET AL.

## Art Unit

2828

### - The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to RCE received 9 September 2008.
2. ☒ The allowed claim(s) is/are 23-33,35 and 37-49.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some\* c) ☐ None of the:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

## Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08),  
Paper No./Mail Date 9 September 2008
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_.

/Minsun Harvey/  
Supervisory Patent Examiner, Art Unit 2828

### **DETAILED ACTION**

1. Claims 1 through 21 originally filed 18 April 2006. Claims 1 through 21 cancelled by preliminary amendment. Claims 22 through 45 added by preliminary amendment. Claim 22 cancelled by amendment received 12 February 2008. Claims 46 through 49 added by amendment received 12 February 2008. Claims 23, 24, 26 through 32, 34 through 36, 38, 39, and 43 amended by amendment received 12 February 2008. Claims 23, 24, 31, 32, and 35 amended by amendment received 9 September 2008. Claims 23 through 49 are pending in this application.

### ***Information Disclosure Statement***

2. The information disclosure statement filed 9 September 2008 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

### **EXAMINER'S AMENDMENT**

3. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

4. Authorization for this examiner's amendment was given in a telephone interview with David Ovedovitz on 25 September 2008.

5. The application has been amended as follows:

Cancel claims 34 and 36.

Claims 23, 24, 32, and 35 should read as follows:

23. A coherent light source comprising:

a wide stripe semiconductor laser capable of exciting a plurality of lateral modes;

a mode converter for beam shaping therein light emitted from the semiconductor laser and for controlling the lateral modes;

a single-mode waveguide to which the light from the semiconductor laser is coupled through the mode converter; and

a wavelength selecting filter through which light exciting an end face of the single-mode wavelength passes, and through which a portion of the light transmitted by the single-mode waveguide simultaneously undergoes wavelength selection and mode selection and is fed back to an active layer of the semiconductor laser using the same exit path,

wherein an oscillation mode of the semiconductor laser is limited by the light that has been fed back, so that the semiconductor laser oscillates in a generally single longitudinal mode and generally single lateral mode,

wherein the portion of the light coupled to the single-mode waveguide is also reflected at the end face of the single-mode waveguide and fed back to the active layer of the semiconductor laser, and

wherein the single-mode waveguide is composed of a nonlinear optical material and has a periodic polarization inversion structure, and

a portion of the light from the semiconductor laser is subjected to wavelength conversion by the polarization inversion structure;

wherein an oscillation wavelength of the semiconductor laser is fixed such that  $[n_2 - n_1]/n_1$  is between 0.2% and 0.5% inclusive,  $n_1$  being a refractive index of the wavelength selecting filter with respect to the light with a wavelength  $\lambda$  and  $n_2$  being a refractive index of the wavelength selecting filter with respect to the light of a wavelength  $\lambda/2$ .

24. A coherent light source comprising:

a wide stripe semiconductor laser;

a mode converter for beam shaping therein light emitted from the semiconductor laser and for controlling the lateral modes;

a single-mode waveguide to which the light from the semiconductor laser is coupled through the mode converter; and

a wavelength selecting filter through which a portion of the light transmitted by the single-mode waveguide is fed back to an active layer of the semiconductor laser and simultaneously undergoes wavelength selection and mode selection,

wherein the oscillation mode of the semiconductor laser is limited by the light that has been fed back,

wherein the wavelength selecting filter includes a band pass filter and a reflector, and the light that has been transmitted by the single-mode waveguide passes through the band pass filter, and then the portion of the light that has been fed back through the wavelength selecting filter is reflected by the reflector and fed back to the active layer of the semiconductor laser, and

wherein the single-mode waveguide is composed of a nonlinear optical material and has a periodic polarization inversion structure, and

a portion of the light from the semiconductor laser is subjected to wavelength conversion by the polarization inversion structure;

wherein an oscillation wavelength of the semiconductor laser is fixed such that  $[n_2 - n_1]/n_1$  is between 0.2% and 0.5% inclusive,  $n_1$  being a refractive index of the wavelength selecting filter with

respect to the light with a wavelength  $\lambda$  and  $n_2$  being a refractive index of the wavelength selecting filter with respect to the light of a wavelength  $\lambda/2$ .

32. A coherent light source comprising:

- a wide stripe semiconductor laser capable of exciting a plurality of lateral modes;
  - a tapered waveguide having an incident end face to which light exiting from the semiconductor laser is coupled;
  - a single-mode waveguide formed on the end face side of the tapered waveguide;
  - a band pass filter through which a portion of the light transmitted by the single-mode waveguide passes; and
  - a reflector that reflects the light transmitted through the band pass filter and feeds the portion of the light back to an active layer of the semiconductor laser using the same exit path,
- wherein the oscillation mode of the semiconductor laser is limited by the light that has been fed back, so that the semiconductor laser oscillates in a generally single longitudinal mode and a generally single lateral mode, and
- wherein the single-mode waveguide is composed of a nonlinear optical material and has a periodic polarization inversion structure, and
- a portion of the light from the semiconductor laser is subjected to wavelength conversion by the polarization inversion structure;
- wherein an oscillation wavelength of the semiconductor laser is fixed such that  $[n_2 - n_1]/n_1$  is between 0.2% and 0.5% inclusive,  $n_1$  being a refractive index of the wavelength selecting filter with respect to the light with a wavelength  $\lambda$  and  $n_2$  being a refractive index of the wavelength selecting filter with respect to the light of a wavelength  $\lambda/2$ .

35. A coherent light source:

- a wide stripe semiconductor laser capable of exciting a plurality of lateral modes, including a Bragg reflection grating;



a tapered waveguide having an incident end face to which light from the semiconductor laser is coupled;

a single-mode waveguide formed on the exit end face side of the tapered waveguide; and

a reflector that reflects a portion of the light transmitted from the single-mode waveguide and feeds the portion of the light back to an active layer of the semiconductor laser using the same exit path,

wherein the oscillation mode of the semiconductor laser is limited by the light that has been fed back, so that the semiconductor laser oscillates in a generally single longitudinal mode and a generally single lateral mode, and

wherein the single-mode waveguide is composed of a nonlinear optical material and has a periodic polarization inversion structure, and

a portion of the light from the semiconductor laser is subjected to wavelength conversion by the polarization inversion structure;

wherein an oscillation wavelength of the semiconductor laser is fixed such that  $[n_2 - n_1]/n_1$  is between 0.2% and 0.5% inclusive,  $n_1$  being a refractive index of the wavelength selecting filter with respect to the light with a wavelength  $\lambda$  and  $n_2$  being a refractive index of the wavelength selecting filter with respect to the light of a wavelength  $\lambda/2$ .

### ***Allowable Subject Matter***

6. Claims 23 through 49 allowed.
7. The following is an examiner's statement of reasons for allowance:
8. Claims 23, 24, 31, 32, and 35 contain limitations requiring a semiconductor light source coupled to wavelength selecting filter and a wavelength conversion device. The wavelength selection device is designed to have a refractive index for a non-converted light to be within 0.2% and 0.5% error of the converted light.

9. Bischel et al. (Bischel, US Patent 5,499,256) is noted as relevant in that this discloses the state of the art in lasers of the nature claimed in the claims presented. However, Bischel makes no contemplation of the requirements of the indexes of refraction of the wavelength selecting device.

10. No prior art indicates that such a range would have been obvious to one of ordinary skill in the art. As such, these claims are allowable.

11. Note is made of JP Patent 2002-131567 as intended to be cited in IDS received 9 September 2008. So as to expedite matters, this reference is noted herein as considered, but does not appear to disclose elements that would overcome the claims as written either alone or in combination with some other reference.

12. All remaining pending claims properly depend upon one of the above mentioned independent claims which have been found allowable over the prior art. As such, all remaining pending claims are noted as allowable as well.

13. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Conclusion***

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to SEAN HAGAN whose telephone number is (571)270-1242. The examiner can normally be reached on Monday-Friday 7:30 - 5:00.

15. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun O. Harvey can be reached on 571-272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

16. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/S. H./  
Examiner, Art Unit 2828

/Minsun Harvey/  
Supervisory Patent Examiner, Art Unit 2828